INSECTS OF MICRONESIA
Coleoptera: Dermestidae[1]

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INTRODUCTION

The dermestid beetles are of particular interest because of the importance of several species as pests of stored food products. Many of the less well-known forms represent potential stored-products pests for which information on distribution and biology is of value. This report summarizes and supplements available information on the species known to occur in Micronesia.

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In connection with this study, I wish to thank Henry S. Dybas of the Chicago Natural History Museum for the loan of specimens in his care. I also wish to express my particular appreciation to J. Balfour-Browne for the loan of type material from the British Museum, and to W. H. Anderson for the illustration of *Thorictodes heydeni*.

The following symbols indicate the museums in which specimens are stored: US (United States National Museum), BM (British Museum, Natural History), BISHOP (Bernice P. Bishop Museum).

ZOOGEOGRAPHY

In general dermestids are found as scavengers on dried protein materials. The large *Dermestes* are often found feeding on carrion in the third, or butyric, stage of decomposition and on dried mammal fur and skin. Other dermestid species are more common in wasp and bee nests, where they feed on old provisions of pollen or insects, in bird nests living on feathers and re-

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the original description of each synonym, faunal papers with particular reference to Micronesia, the most recent revisionary studies, and biological summaries are cited. The bibliographies of the remaining genera and species are as complete as I have been able to make them.

Key to Adults of Micronesian Species of Dermestidae

1. Compound eyes absent; hind coxa ovate, without groove for reception of femur; minute brownish beetles with general appearance of a *Dermestes* .... **1. Thorictodes heydeni**
   Compound eyes present; hind coxa transverse with posterior groove for reception of femur........ 2

2(1). Median ocellus absent; male with median tuft of hairs arising from pit on abdominal sternite 4 (and sometimes on 3)........ 3
   Ocellus present; male without median hair tufts on abdominal sternites........ 4

3(2). Apex of each elytron produced caudally to form small spine; apical margin before spine denticulate; male with median hair tuft on abdominal sternite 4 only........ **2. Dermestes maculatus**
   Apex of each elytron not produced to form spine; apical margin more or less smooth; male with median hair tuft on both abdominal sternites 3 and 4........ **3. Dermestes ater**

4(2). Pronotum with prominent sublateral carinae in addition to carina at each lateral margin; prosternal process short, not received in groove in mesosternum; female with median tuft of hairs arising near posterior margin of abdominal sternite 1........ **4. Evorinea iota**
   Pronotum without sublateral carinae; prosternal process elongate and received in longitudinal groove on mesosternum; female without median tuft of hairs on abdominal sternite 1........ 5

5(4). Segment 1 of hind tarsus less than two-thirds as long as segment 2; antennal fossa open behind; body without broad, flat scales........ 6
   Segment 1 of hind tarsus distinctly longer than segment 2; antennal fossa either closed behind by thin, knifelike carina which extends to or nearly to lateral margin of pronotum, or antennal fossa set deeply in anterior half of hypomeron; body with or without broad, flat scales........ 7

6(5). Disc of mesosternum nearly twice as wide as long; body strongly convex and broadly oval........ **5. Aethriostoma undulata**
   Disc of mesosternum nearly twice as long as wide; body more narrowly obovate and less convex........ **6. Attagenus** sp.

7(5). Body clothed with broad, flat scales........ **7. Anthrenus fuscus**
   Body with or without somewhat flattened ensiform setae, but never with broad, flat scales........ 8

8(7). Antennal club elongate; female antennal club composed of four segments; male antennal club of more than four segments (fig. 5)........ **12. Trogoderma anthrenoides**
   Antennal club composed of two segments, these segments in male forming a club nearly circular in outline, in female a club oval in outline........ 9

9(8). Dorsal integument bicolorous; antennal cavity closed behind by narrow band of hypomeron in addition to sharp carina........ **9. Orphinus terminale**
   Dorsal integument unicolorous; antennal cavity occupying all of hypomeron with none of hypomeron visible behind carina bounding rear margin of cavity........ 10

10(9). Dorsal pubescence unicolorous..**8. Orphinus fulvipes**
Dorsal pubescence of dark hairs with several patches or bands of creamy white pubescence on pronotum and elytra........................**10. Orphinus nesioticus**

THORICTINI

Genus **Thorictodes** Reitter

Thorictodes Reitter, 1875, IN Harold, Coleopt. Hefte **14**: 45-46 (type: *T. heydeni* Reitter, monobasic).—van Emden, 1951, Brooklyn Ent. Soc., Bull. **46**: 39-41.—Crowson, 1955, Nat. Classif. Fam. Coleopt., London, 75.

Thaumaphrastus Blaisdell, 1927, Ent. Soc. Washington, Proc. **29**: 123; Anderson, 1949, Brooklyn Ent. Soc., Bull. **44**: 121-127.

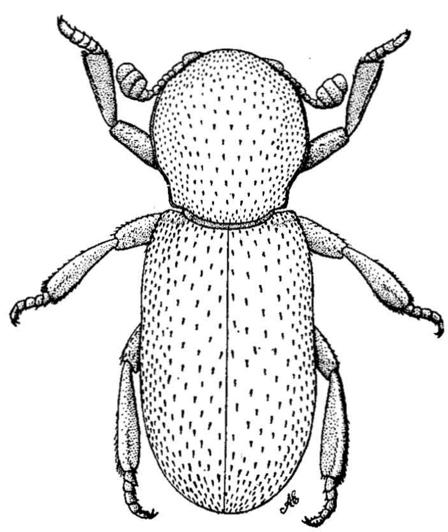


FIGURE 1.—*Thorictodes heydeni,* adult.

1. **Thorictodes heydeni** Reitter (fig. 1).

Thorictodes heydeni Reitter, 1875, IN Harold, Coleopt. Hefte **14**: 46.—Ganglbauer, 1899, Käfer Mitteleuropa **3**: 765.—van Emden, 1924, Treubia **6**: 6; 1951, Brooklyn Ent. Soc., Bull. **46**: 39-41.

Thaumaphrastus karanisensis Blaisdell, 1927, Ent. Soc. Washington, Proc. **29**: 123-125, pl. 6.—Anderson, 1949, Brooklyn Ent. Soc., Bull. **44**: 121-127.

DISTRIBUTION: North Africa (type locality: Egypt and Algeria), France, India, United States (Texas, Nebraska), Mexico, S. Mariana Is. (Saipan).

S. MARIANA IS. SAIPAN: Chalan Kanoa, Jan. 1945, Dybas.

This species is probably cosmopolitan, but is seldom noticed because of its minute size. In Texas it was found as a pest in a rice mill and has been intercepted with sweet potatoes from India in quarantine at New York City (Anderson, 1949, Brooklyn Ent. Soc., Bull. **44**: 121-127). The specimens from Saipan were found in mixed grain chicken feed in a native village.

This species is the only one in the genus and is not likely to be confused with any other. The larvae have been described in detail by Anderson. They may most easily be distinguished from the larvae of other Dermestidae known to occur in Micronesia by the presence of urogomphi and by the absence of spicisetae (spinulate or "rat-tail" setae) or hastisetae (spear-headed setae) on the body. The setae of the body consist of long, simple hairs inserted singly and in pairs and of a few short, flat, somewhat ensiform hairs. The larvae are further separated by the form of the setae of the labro-epipharyngeal margin, which do not become broader or leaflike toward the midline, as in other known dermestid larvae.

DERMESTINI

Genus **Dermestes** Linnaeus

Dermestes Linnaeus, 1758, Syst. Nat., ed. 10, 354 (type: *D. lardarius* Linnaeus, designated by Latreille, 1810, Considérations sur l'ordre naturel, 428).—Rees, 1943, U. S. Dept. Agric., Misc. Pub. **511**: 3, 6, 8.—Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 260-261.—Lepesme, 1946 (1950), Soc. Ent. France, Ann. **115**: 37-41.—Rees, 1947, Ent. Soc. Washington, Proc. **49**: 1-2.

Adults of this genus are readily distinguished from all other dermestids by their large size and by the absence of a median ocellus. Two undescribed North American species of Dermestidae related to members of the genus *Megatoma* also lack a median ocellus, but all other known species possess this structure. More or less mature larvae of *Dermestes* may be recognized by the presence of a pair of moderately prominent urogomphi on abdominal segment 9, by the fact that abdominal segment 10 is always a completely sclerotized and pigmented ring, and by the arrangement of the spinulate setae of the abdominal tergites, some of which are in eight distinct, oblique series across each tergite.

Larvae of the two species of *Dermestes* found in Micronesia may be distinguished by the following characters:

Median yellowish stripe extending length of each tergite; transverse series of retrorse tubercles present on anterior margin of abdominal tergites 4 to 9, each tubercle with terminal wartlike processes and terminal seta .... **maculatus**

Median yellowish stripe discontinuous, extending posteriorly from anterior margin of mesonotum, generally present through length of anterior tergites, but remaining evident only in posterior membranous area of posterior segments; retrorse tubercles absent .... **ater**

2. **Dermestes maculatus** De Geer.

Dermestes maculatus De Geer, 1774, Mém. Hist. Ins. **4**: 223 (Surinam).—Barber, 1942, Brooklyn Ent. Soc., Bull. **37**: 175.—Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 261; 1946, Roy. Ent. Soc. London, Trans. **97**: 484.—Lepesme, 1946 (1950), Soc. Ent. France, Ann. **115**: 46.—Rees, 1947, Ent. Soc. Washington, Proc. **49**: 13.

Dermestes vulpinus Fabricius, 1781, Species Insectorum **1**: 64 [*fide* Barber, 1942, but Kalík, 1955, Explor. Parc Nat. Albert Belg. Congo, Miss. de Witte, fasc. **38** (6): 93, treats it as subspecies of *maculatus*].—Kano, 1930, Biogeogr. Soc. Japan, Bull. **1** (3): 241, 244.—Rees, 1943, U. S. Dept. Agric., Misc. Pub. **511**: 14-17.

Dermestes marginatus Thunberg, 1781, Nov. Ins. Spec. **1**: 7, fig. 6.

Dermestes senex Germar, 1824, Ins. Spec. Nov., 84.

Dermestes lateralis Sturm, 1826, Cat. Ins. Sammlung, 130.

Dermestes elongatus Hope, 1834, IN Pettigrew, Hist. Egypt. Mummies, 55.

Dermestes lupinus Erichson, 1843, Archiv. Naturgesch. **9**: 206.

Dermestes semistriatus Boheman, 1851, Ins. Caffraria **1** (2): 583 (part).

Dermestes sudanicus Gredler, 1877, Zool.-Bot. Ges. Wien, Verhandl. **27**: 506.

Dermestes truncatus Casey, 1916, Mem. Coleopt. **7**: 180 (n. syn.).

DISTRIBUTION: Virtually cosmopolitan; Micronesia in Bonin Is., S. Mariana Is., and Caroline Is.

S. MARIANA IS. SAIPAN: July 1940, Matusita; Charanka, June 1938, Yamada; Garapan, Nov. 1937, Esaki. TINIAN: July 1940, Matusita. GUAM: Pt. Ritidian, May, June 1945, Gressitt; Pt. Oca, June 1945, Dybas; Pt. Oca, May, June 1945, Bohart and Gressitt.

PALAU. PELELIU: East coast, Aug. 1945, Dybas.

TRUK. TON (Pata): Sabote-Epin, Apr. 1940, Yasumatsu and Yoshimura.

I have not seen the specimens reported from the Bonin Islands by Kano, but there is no reason to doubt the validity of the identification.

This species is not likely to be confused with any other *Dermestes*, being distinguished from all other species except *madagascariensis* Lepesme by the presence of a spine at the apex of each elytron. In *maculatus* the sublateral patches of white pubescence on the last abdominal sternite extend from the base to the margin of the sternite. On the other hand, in *madagascariensis*,

the patches of white pubescence are confined to the basal area of the sternite. In its general fascies, *maculatus* very closely resembles the widespread *frischi* Kügelann, which is likely to be introduced into Micronesia. *D. frischi* differs, however, in the absence of an elytral spine and in the fact that the patches of white pubescence on the last abdominal sternite are not separated but are broadly joined at the base.

This species is of economic importance because the mature larvae bore into wood or into almost any other compact substance in the preparation of pupal chambers. Even more serious is the damage done by both larvae and adults to dried skins, dried fish, cured meat, and other products of high protein content. Economic damage done by the species is summarized by Hinton (1945, Monogr. Beetles Assoc. Stored Products **1**: 261). Scoggin and Tauber (1949, Iowa State Coll., Jour. Sci. **23**: 363-373), Scoggin (1951, op cit., **25**: 353-354), and Kalshoven (1954, Ent. Bericht. Amsterdam **15**: 112-116) detail the life history of the species.

3. **Dermestes ater** De Geer.

Dermestes ater De Geer, 1774, Mém. Hist. Ins. **4**: 223, 453, pl. 18, fig. 7 (Surinam).—Barber, 1942, Brooklyn Ent. Soc., Bull. **37**: 174.—Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 296-299; 1946, Roy. Ent. Soc. London, Trans. **97**: 484.—Lepesme, 1946 (1950), Soc. Ent. France, Ann. **115**: 61.—Rees, 1947, Ent. Soc. Washington, Proc. **49**: 10.—Roth and Willis, 1950, Am. Midland Naturalist **44**: 427-447.

Dermestes cadaverinus Fabricius, 1775, Syst. Ent., 55.

Dermestes piceus Thunberg, 1781, Nov. Ins. Spec. **1**: 8.

Dermestes felinus Fabricius, 1787, Mant. Ins. **1**: 3.

Dermestes domesticus Germar, 1824, Ins. Spec. Nov., 83.

Dermestes semistriatus Boheman, 1851, Ins. Caffraria **1** (2): 583 (part).

Dermestes hispidulus Montrouzier, 1860, Soc. Ent. France, Ann. III, **8**: 264.

Dermestes chinensis Motschulsky, 1866, Soc. Nat. Moscou, Bull. **39**: 168.

Dermestes subcostatus Murray, 1867, Ann. Mag. Nat. Hist. III, **20**: 22.

Dermestes noxius Mulsant and Rey, 1867 (1868), Soc. Linn. Lyon, Ann. n. s., **15**: 55-57.

Dermestes favarcqui Godard, 1882 (1883), Soc. Linn. Lyon, Ann. n.s., **29**: 383.

DISTRIBUTION: Cosmopolitan; probably found throughout Micronesia.

N. MARIANA IS. PAGAN.

S. MARIANA IS. SAIPAN: East of Tanapag, Jan. 1945, Dybas; Apr. 1945, Hagen. TINIAN: June 1952, Kondo. AGIGUAN: Jan. 1949, Owen; May, June 1952, Bronson, Kondo, Peterson. GUAM: June 1945, Stuntz; Pt. Ritidian,

May, June 1945, Bohart and Gressitt; Pt. Oca, Mar. 1945, Gressitt and June 1945, Bohart and Gressitt.

PALAU. KOROR: Oct. 1951, Gressitt; May 1953, Beardsley. NGARDOK: May 1937, Ono.

CAROLINE ATOLLS. ULITHI: Fassarai, Sept. 1956, McDaniel.

KUSAIE. Lele I., 100 m., Apr. 1953, Clarke.

MARSHALL IS. ENIWETOK: Jobtan (Japtan) I., May 1946, Townes. KWAJALEIN: Ebeye I., Mar., Apr., June 1944, Wallace; Sept. 1952, Fosberg, No. 1442, 1446. POKAK: Sibylla I., July 1952, Fosberg, No. 1194; Kamome I., July 1952, Fosberg, No. 1199. JALUIT: Elizabeth I., Sept. 1953, Beardsley; Jabor I., May 1958, Gressitt.

GILBERT IS. ONOTOA: Buiartun I., Aug. 1951, Moul. ABEMAMA: May 1944, Moul.

WAKE. WAKE: June 1947, Martin; Nov. 1953, Joyce; Apr. 1952, Fosberg, No. 105-6. PEALE: June, Aug. 1940, T. Lyons.

The characters given in the key readily distinguish this species from the only other *Dermestes* known to occur in Micronesia. It is, however, very similar in appearance to *peruvianus* Castelnau, a nearly cosmopolitan species which should appear sooner or later in these islands. It may be readily separated from *peruvianus* and others in the same group by the presence of four spots of darker pubescence at the base of abdominal sternites 2, 3, and 4. The size of these spots may vary, sometimes being so large as almost to coalesce and at other times being rather small. Nevertheless they are always distinct if the specimen is held so that a bright light reflects from the abdominal pubescence. In addition, the unique structure of the aedeagus distinguishes the male from all other species of *Dermestes*. From the slightly expanded and bilobed apex of the aedeagus project two diverging, minute, but heavily sclerotized and distinct teeth, each of which bears several acute denticles. No other dermestid known at present has any such aedeagal structure.

In nature the species is commonly found in carcasses of mammals, birds, fish, crabs and other arthropods, et cetera. A specimen collected on Johnston Island by A. C. Browne was found in the burrow of a moaning bird or shearwater (*Puffinus pacificus*). Doubtlessly the same habitat and others similar to it are utilized by the species throughout the south Pacific. The life history of the species has been worked out in some detail by Roth and Willis (1950, Am. Midland Naturalist **44**: 427-447).

As an economic pest, the species is perhaps not so important as *D. maculatus*, but it is nonetheless a serious depredator of dried fish, cured meats, hides, and other stored products of high protein content. Hinton (1945, Monogr. Beetles Assoc. Stored Products **1**: 296-299) lists the various products which the species has been found to attack. It has been found as a minor pest in a warehouse on Lele Island off Kusaie Island in the Carolines.

TRINODIINI

Genus **Evorinea** Beal, new genus

Apsectus, Arrow, 1915, Ann. Mag. Nat. Hist. VIII, **15**: 449 (in part).
Type: *Apsectus iota* Arrow, 1915.

Adult male: Body broadly oval and strongly convex. Dorsal surface moderately densely clothed with long setae; setae of elytra in alternating longitudinal rows of erect and subrecumbent hairs. Antenna 11-segmented; club of one or two segments. Mouthparts resting against anterior margin of prosternum rather than against coxae. Prosternum about as long as mesosternum; posterior process short and wide, barely attaining middle of procoxae and dividing procoxae by width greater than distance between bases of antennae, shallowly emarginate posteriad for reception of rounded anterior margin of mesosternum. Mesosternum not sulcate; mesosternum between coxae about twice as wide as long. Intercoxal process of metasternum very short, without fovea, separating metacoxae by distance subequal to twice width of coxa; posterior margin straight, without median emargination. Metacoxa abutting squarely against inner margin of metepisternum, not extending to metepimeron.

Adult female: Antennal club two-segmented. Abdominal sternite 1 bearing dense cluster of punctures on slightly raised area near posterior margin from which arise number of long setae.

The New World genus *Apsectus* LeConte has been distinguished from the Old World genus *Trinodes* Latreille by the structure of the prosternum and the mesosternum. In the latter the prosternum is extended posteriad in an acuminate process which fits in a sulcus in the mesosternum. In *Apsectus* the prosternal process is short, truncate, and is not received into a groove in the mesosternum. In his revision of the family, Arrow (1915, Ann. Mag. Nat. Hist. VIII, **15**: 449) placed in *Apsectus* three oriental species which resembled the American species in these sternal characters. However, these species appear to be as distinct from *Apsectus* as from *Trinodes,* and to preserve an understanding of their relationships they should be placed in a separate genus. Therefore I am describing this new genus, to which should be transferred *Apsectus iota* Arrow (1915, loc. cit.), *A. indicus* Arrow (1915, loc. cit.), and *A. hirtellus* (Walker, 1858, Ann. Mag. Nat. Hist. III, **2**: 207).

Members of this genus are readily separated from other genera in the subfamily by the structure of the antennal club, by the character of the dorsal pubescence, and by various sternal structures. In *Evorinea* the female antennal club is two-segmented, but three-segmented in *Apsectus* and *Trinodes.* The male antennal club of *Evorinea* is composed of one large segment only or of a large and a much smaller segment. In *Apsectus* and *Trinodes* the male club is definitely three-segmented, although, in some species of *Apsectus,* segments 9 and 10 are very short. *Hexanodes* Blair (1941, Ent. Month. Mag. **77**: 15) is said to have a long, loose antennal club composed of six segments. The dorsal pubescence of *Evorinea* consists of alternating rows of erect and subrecumbent hairs. This is not true of *Apsectus.* Species of *Trinodes* may have pubescence

of this type or may have dorsal pubescence consisting of all erect hairs. The prosternum of *Evorinea* is approximately as long as the mesosternum, but is not extended posteriad as a spine, as in *Trinodes*. Instead the posterior process is very short with a posterior emargination which receives the rounded anterior margin of the mesosternum. In this respect it is similar to *Apsectus*. It is quite different from the description given of *Hexanodes,* in which the prosternum is said to be very short, not dividing the procoxae, and allowing the mouthparts to rest against the coxae. The posterior margin of the metasternum bears a small median emargination in *Apsectus* and *Trinodes* but is entire and straight in *Evorinea*. *Trinodes minutus* Pic does not have a posterior emargination of the metasternum and has dorsal setae similar to those of *Evorinea*. However, in antennal and prosternal characters it seems to belong to *Trinodes*. Females of *Evorinea* may also be distinguished from females of other genera by the presence on abdominal sternite 1 of a pitlike cluster of punctures from which arise a number of long setae.

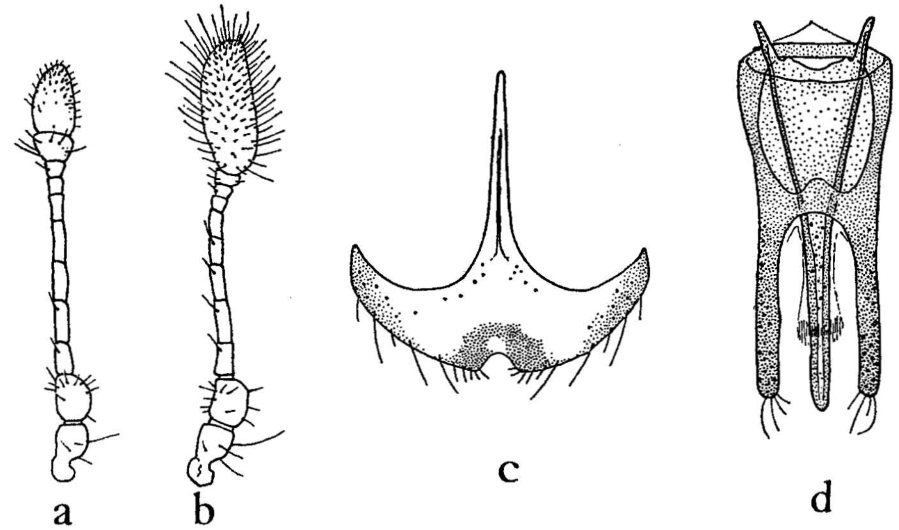


FIGURE 2.—*Evorinea iota:* **a,** female antenna; **b,** male antenna; **c,** periphallic sternite 1 of male genital tube; **d,** parameres and aedeagus.

4. **Evorinea iota** (Arrow), n. comb. (fig. 2).

Apsectus iota Arrow, 1915, Ann. Mag. Nat. Hist. VIII, **15**: 449 [Tanimbar (Tenimber) Is. (Larat); type in BM].

Adult male: Integument black; legs and antennae brown. Dorsal setae light to medium brown; longest setae of dorsum (those on margins of elytra toward base) slightly more than one-half as long as length of metatibia; no row of very short setae along median

suture of elytra. Antennal club consisting of single large segment as illustrated. Pronotum with submarginal carinae extending from base two-thirds distance to anterior margin; submarginal carina and marginal carina slightly diverging anteriorly; punctures of surface between submarginal and marginal carinae simple or slightly craterform, not more than 1.5 times as large as facet of eye, separated by 1.5 to 3 times their own diameter. Periphallic sternite 1 and phallus as illustrated. Length of pronotum and elytra ranging from 1.2 mm. to 1.5 mm.; ratio of width across humeri to length varying from 1: 1.42 to 1: 1.61.

Adult female: Dense cluster of punctures near posterior margin of abdominal sternite 1 forming patch about 3 times as wide as long. Configuration of antennal club as illustrated.

DISTRIBUTION: Tanimbar Is., Philippine Is., Caroline Is., S. Mariana Is.

S. MARIANA IS. SAIPAN: Mt. Achugau area, Dec. 1944, Dybas; Garapan, Jan. 1945, Dybas, and Mar. 1940, Yasumatsu and Yoshimura. TINIAN: Nov. 1952, Beardsley; Mt. Lasso, northwest slope, Mar. 1945, Dybas. GUAM: Fadang, Jan. 1945, Dybas; Merizo, June 1936, Swezey; Pt. Oca, June 1945, Dybas; "root farm," Aug. 1938, Oakley; Barrigada, Oct. 1957, Krauss.

PALAU. BABELTHUAP: Imeliik, Aug. 1953, Beardsley. KOROR: Sept., Dec. 1952, Apr., July 1953, Beardsley.

CAROLINE ATOLLS. NAMA: Nama I., Oct. 1952, Beardsley. ELATO: Elato I., Feb. 1953, Beardsley.

TRUK. WENA (Moen): Feb. 1954, Beardsley; May, July 1946, Townes. TONOAS (Dublon): May 1946, Townes; (Toloas-Erin), Apr. 1940, Yasumatsu and Yoshimura.

PONAPE. Colonia, Nov. 1953, Beardsley.

A previously unpublished record for this species outside Micronesia is Isabela Island in the Philippine Islands in February 1949 by H. D. Smith. Eventually it will probably be found on New Guinea and throughout the Moluccas. Virtually nothing is known of its biology. It has been found on banana leaves, but it is probably not phytophagous. All other species in the subfamily for which the habits are known feed on dry animal substances, with many found commonly in spider nests. In the Philippines it was found on jasmine associated with the aleurodid *Aleurocanthus spiniferus*. It was taken on Tinian "ex chile pepper and young coconut" by J. W. Beardsley.

ATTAGENINI

Genus **Aethriostoma** Motschulsky

Aethriostoma Motschulsky, 1858, Études Ent. **7**: 47 (type: *A. undulata* Motschulsky, monobasic).

Brachysphyrus Blackburn, 1903, Roy. Soc. S. Australia, Trans. **27**: 160.

Attagenus (*Telopes*), Arrow, 1915, Ann. Mag. Nat. Hist. VIII, **15**: 426.

Attagenus (*Pseudotelopes*) Pic, 1916, Mélanges Exot. Ent. **17**: 2-3 (n. syn.).

Attagenus, Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 305-306.

Assuming that the species now assigned to this genus properly belong to it, the genus is distributed from Madagascar throughout the Indo-Chinese zoogeographical area and Australia to Micronesia.

Arrow (1915, Ann. Mag. Nat. Hist. VIII, **15**: 426) assigned the type species of this genus to the subgenus *Telopes* of *Attagenus*. I believe, however, its divergence from *Attagenus* is great enough to warrant its retention in a separate genus. It differs from *Attagenus obtusus* Gyllenhal, the type species of the subgenus *Telopes,* in the following respects: The clypeal area is extremely short rather than elongate and the mouthparts, particularly the maxillary palpi, are correspondingly shortened; the metacoxa is broadly joined to the metepimeron rather than just meeting the metepimeron at the angle of the metepisternum; and the disc of the mesosternum is three-fifths as long as wide and somewhat rectangular in shape. On the other hand, the disc of the mesosternum of *A.* (*Telopes*) *obtusus* is somewhat sagittate and about one and two-thirds as long as wide. The femora of *Aethriostoma undulata* are quite flattened, the femoral sulcus which receives the tarsus being oblique rather than perpendicular to the dorsoventral axis of the femur. The posterior ventral carina of both the meso- and metafemora is very indistinct at the base and absent at the middle. In *Attagenus* (*Telopes*) *obtusus,* both ventral carinae are very distinct on each femur and the plane or sulcus formed between the carinae is more or less at right angles to the dorsoventral axis of the femur. Other striking differences between the two species are to be found in the ovipositors of each. Whether these genitalic characters are of generic value cannot be known without a more complete study of the variations in this organ in the group as a whole.

Three other species are currently assigned to this genus. What their relationships may be to *Aethriostoma undulata* I am unable to say, since I have not had the species available for study and since the published descriptions are inadequate for a comparison of significant structures.

5. Aethriostoma undulata Motschulsky (fig. 3).

Aethriostoma undulata Motschulsky, 1858, Études Ent. **7**: 47, pl. 2, fig. 10 (East Indies).—Reitter, 1880 (1881), Nat. Ver. Brünn, Verhandl. **19**: 35.—Blair, 1929, Federated Malay States Mus., Jour. **14**: 382.—Kalshoven, 1937, Ent. Meded. Ned.-Ind. Buitenzorg **3**: 32-33.

Attagenus rufipes Walker, 1859, Ann. Mag. Nat. Hist. III, **3**: 53.

Brachysphyrus irroratus Blackburn, 1903, Roy. Soc. S. Australia, Trans. **27**: 160.

Attagenus (*Telopes*) *undulatus,* Arrow, 1915, Ann. Mag. Nat. Hist. VIII, **15**: 426.

Attagenus (*Pseudotelopes*) *testaceipes* Pic, 1916, Mélanges Exot. Ent. **17**: 2-3 (n. syn.).

A further distinguishing character is found in the posterior extension of the side pieces of the prosternum of *Neoanthrenus*.

The subgenus *Helocerus* is characterized by a five-segmented antenna (rarely six segments in the female) with a one-segmented antennal club.

7. Anthrenus fuscus Olivier.

Anthrenus fuscus Olivier, 1789, Encycl. Méth. **4**: 152 (environs of Paris, France).—Kano, 1930, Biogeogr. Soc. Japan. Bull. **1** (3) : 241.—Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 357-359.—Mroczkowski, 1951, Mus. Zool. Polonici, Ann. **14**: 257.—Woodroffe and Southgate, 1954, Bull. Ent. Res. **45**: 575-583.

Anthrenus claviger Erichson, 1846, Naturgesch. Ins. Deutsch. **3**: 458.

DISTRIBUTION: Palearctic area, northeastern North America, Bonin Is.

I have not seen the specimens recorded by Kano [1930 Biogeogr. Soc. Japan, Bull. **1** (3) : 241] from the Bonin Islands, nor any others of this species from Micronesia. There is, however, no reason to doubt the identification. In a comparison with other species of the same genus in England, Woodroffe and Southgate (1954, Bull. Ent. Res. **45**: 575-583) found that *A. fuscus* larvae characteristically are found feeding on dead insects around spiders' webs, under the bark of trees, in outhouses, and in crevices in fences. The species is not often found as an inhabitant of dry birds' nests as in the case of certain other *Anthrenus*. The species is an occasional pest of stored products and households, but only of minor importance. A summary of the knowledge of the life history of this insect is given in Hinton (1945, Monogr. Beetles Assoc. Stored Products **1**: 357-359).

Genus **Orphinus** Motschulsky

Orphinus Motschulsky, 1858, Études Ent. **7**: 48 (type: *O. haemorrhoidalis* Motschulsky, designated by Arrow, 1915).—Arrow, 1915, Ann. Mag. Nat. Hist. VIII, **15**: 437.—Armstrong, 1943, Linn. Soc. New South Wales, Proc. **68**: 62-63; 1945, loc. cit., **70**: 47, 51.—Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 367.

Aethriosia Reitter, 1908, Soc. Ent. Egypte, Bull. **1**: 45 (type: *A. globulicornis* Reitter, monobasic).

Adult male: Body broadly oval to obovate, moderately strongly convex, moderately densely clothed with subrecumbent simple hairs. Median ocellus distinct. Antenna 11-segmented; antennal club of two segments, segment 1 short and transverse and 2 much larger, the two together being nearly circular in outline; two segments preceding club somewhat expanded or not. Pronotum without diagonal, impunctate area on either side of basal lobe. Antennal cavity bounded behind by sharp knifelike carina or by posterior extension of hypomeron. Prosternum with posterior process moderately long and narrow and received into mesosternal sulcus. Mesosternal disc deeply and completely divided by sulcus.

Metacoxa broadly joined to metepimeron, metepisternum not extending to posterior margin of metacoxa. Tibiae without distinct teeth but with feeble spines on lateral margins. Abdomen with sublateral discal carinae or striae on sternite 1.

Adult female: Antennal club smaller; penultimate segment one-half to one-third as long as terminal segment. Antennal cavity occupying all of hypomeron or limited to anterior one-half or one-third of hypomeron; antennal cavity bounded behind by knifelike carina, but no carina present on hypomeron behind this carina.

DISTRIBUTION: With the exception of *Orphinus fulvipes,* which is found throughout all the tropical areas of the world, the 35 species now assigned to the genus are found in the Ethiopian, Oriental, and Australian faunal regions, Japan, and the Hawaiian Islands.

This genus is very closely related to *Thaumaglossa,* enough so that females of the two genera are easily confused. In *Thaumaglossa,* however, the pronotum has two short, diagonal, impunctate areas on either side of the basal lobe, the terminal segment of the male antennal club is exceptionally large and subtriangular in outline, and the hypomeron of the female has, in addition to a sharp carina bounding the antennal fossa, another carina extending from the procoxa to the posterior angle of the pronotum. The structure of the antennal club of *Orphinus* also distinguishes this genus from the New World genera *Cryptorhopalum* and *Hemirhopalum.* In these genera, the club is oval or elongate rather than round and the segments of the club are subequal in length or segment 1 is longer than 2.

8. **Orphinus fulvipes** (Guérin-Méneville). (Figure 4.)

Globicornis fulvipes Guérin-Méneville, 1838, Rev. Zool. Paris, 135 (Cuba). —Rees, 1943, U. S. Dept. Agric., Misc. Pub. **511**: 11-12, 18.

Hadrotoma fulvipes, Reitter, 1880 (1881), Nat. Ver. Brünn, Verhandl. **19** (2): 37.

Cryptorhopalum brevicorne Sharp, 1885, IN Blackburn and Sharp, Roy. Dublin Soc. II, Trans. **3**: 150 (Honolulu, Hawaiian Is.); 1908, Fauna Hawaiiensis **3** (5): 413.

Trogoderma unicolor Kolbe, 1910, Zool. Mus. Berlin, Mitt. **5**: 24-25 (Mahé I., Seychelle Is.).

Orphinus brevicornis, Arrow, 1915, Ann. Mag. Nat. Hist. VIII, **15**: 438.—Scott, 1926, Ann. Mag. Nat. Hist. IX, **18**: 61.

Orphinus fulvipes, Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 368, 369.—Mroczkowski, 1954, Polish Ent. Soc. **79**: 28.—Kalshoven, 1955, Idea., Bogor **10**: 50-53.

Adult male: Dorsal integument uniformly dark brown, ventral integument somewhat lighter. Dorsal pubescence uniformly brown; ventral pubescence lighter golden brown. Antenna with segment 8 about 1.5 as wide as segment 3; segment 9 about 2 times as wide as segment 3 but only one-third as wide as segment 11; segments 10 and 11 together forming nearly circular club; segment 11 is 0.60 to 0.65 times as wide as longest diameter of eye. Antennal cavity occupying all of hypomeron and sharply delimited behind by knifelike carina which ends slightly before, but opposite, basal two-fifths of lateral margin

segment 9 less than 1.5 times as wide as segment 3; segments 10 and 11 together forming oval club; segment 11 is 3.5 times as wide as segment 9, 1.16 times as long as wide, and about two-thirds as wide as longest diameter of eye. Each elytron with crescent-shaped band of light maculation of variable width at basal third, the band usually not attaining median suture but never separated from it by more than width of scutellum; apical one-third or one-fourth of each elytron light maculate. Rarely antemedian band and posterior light maculate area tend to fuse. Antennal cavity occupying most of hypomeron, except for narrow part which, directly behind middle of cavity, is about as wide as width of antennal funicle; cavity bounded behind by low carina which forms anterior margin of narrow posterior part of hypomeron and which ends slightly before, but opposite, middle of lateral margin of pronotum. Posterior margin of abdominal sternite 5 not impressed, not bearing tubercles, and not bearing pair of sharp spines. Length of pronotum and elytra ranging from 1.6 mm. to 2.1 mm. Ratio of width across humeri to length 1 : 1.64.

Adult female: Antennal cavity much smaller; width of hypomeron directly behind middle of cavity about 3 times width of antennal funicle. Length of pronotum and elytra ranging from 1.8 mm. to 2.5 mm. Ratio of width across humeri to length ranging from 1 : 1.57 to 1 : 1.65.

DISTRIBUTION: Hawaiian Is., Philippine Is. (unpublished data), Samoa (unpublished data), S. Mariana Is., Marshall Is., Gilbert Is.

S. MARIANA IS. GUAM: Pt. Oca near Agana, May 24, 1945, G. Bohart and Gressitt.

MARSHALL IS. JALUIT: Jabor I., Apr. 26, 1958, Gressitt.

GILBERT IS. TARAWA: Banraeaba, Dec. 1957, Krauss.

This is a rather uncommon species. Several specimens were reared in the Hawaiian Islands by O. H. Swezey from old mantid egg masses. Whether the species is an obligate upon mantid egg masses, as is true of members of the closely related genus *Thaumaglossa,* is not known.

10. **Orphinus nesioticus** Beal, n. sp. (fig. 4, *a*).

Adult male: Dorsal and ventral integument uniformly black; legs and antennae brown. Dorsal pubescence of dark-brown hairs with intermingled, slightly coarser, creamy-white hairs distributed as follows: a few on anterolateral margin of pronotum, a patch on posterolateral area of pronotum, two small patches on basal lobe of pronotum, an indistinct basal loop or circle on each elytron with an interrupted line extending laterally to margin, and a few isolated hairs on postmedian area and near apical margin. Ventral pubescence light golden brown. Antenna with configuration as illustrated; antennal club three-fourths as wide as longest diameter of eye. Antennal cavity occupying all of hypomeron and sharply delimited behind by knifelike carina ending slightly before, but opposite, basal third of lateral margin of pronotum. Floor of antennal cavity shining and smooth, almost completely impunctate and without microstriae. Posterior margin of abdominal sternite 5 not impressed, not bearing pair of tubercles, and not bearing pair of sharp spines. Length of pronotum and elytra 1.48 mm.; width across humeri 0.98. mm.

Holotype, male (BISHOP 2766), northern Guam I., Apr. 29, 1946, Krauss. No other specimens known.

DISTRIBUTION: S. Mariana Is. (Guam).

This species appears to be quite distinct from any described forms of *Orphinus.* The structure of the antennal fossa relates it more nearly to *fulvipes* than to *terminale.*

11. Orphinus sp.

DISTRIBUTION: Bonin Is.

BONIN IS. CHICHI JIMA: Omura, July 10, 1949, Mead.

I am unable to identify the one, somewhat abraded female. It belongs to a species near *O. fulvipes.*

Genus **Trogoderma** Berthold (Latreille?)

Trogoderma (Dejean, 1821, Cat. Coléopt. **2**: 46, credited to Latreille) Berthold, 1827, IN Latreille, Natürliche Fam. Thierr., 352 [type: *Anthrenus elongatulus* Fabricius, 1801 (= *Anthrenus glaber* Herbst, 1783), cited by Hope, 1840, Coleopt. Manual **3**: 143].—Rees, 1943, U. S. Dept. Agric., Misc. Pub. **511**: 11.—Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 375; 1946, Roy. Ent. Soc. London, Trans. **97**: 480.—Beal, 1954, Univ. Calif. Pub. Ent. **10** (2): 50-52.

This genus is cosmopolitan in its distribution. It includes some of the most destructive members of the family, including the khapra beetle, *T. granarium,* a serious pest of stored grain. Many members of the genus will survive in stored grain, but most species prefer food with a higher protein content.

12. Trogoderma anthrenoides (Sharp), n. comb. (fig. 5).

Eucnocerus anthrenoides Sharp, 1902, Biol. Centr. Am. Zool., Coleopt. 2 (1): 649 (Playa Vicente, Mexico; type in BM).—Swezey, 1921, Hawaiian Ent. Soc., Proc. **4** (3): 487.

Trogoderma ornatum, Hinton, 1945, Monogr. Beetles Assoc. Stored Products **1**: 399 (in part).

Adult male: Color of dorsal and ventral surfaces black with reddish- to medium-brown maculae on pronotum and elytra; antennae and legs dark to light brown. Pubescence of dorsal surfaces coarse, suberect, consisting of black, golden-brown, and light hairs; pubescence of ventral surfaces moderately fine, subrecumbent, cinereous. Antenna 11-segmented, extending in repose to basal fifth of prothorax, densely set with fine, short, erect hairs; segments 3 to 10 pectinate; segment 3 subequal in width to segment 4; segment 11 eccentrically placed on pedicel; configuration as illustrated. Light maculation of elytron forming basal loop or circle with subhumeral band extending from loop to lateral margin of elytron, median band which does not extend more than one-half distance from median suture to lateral margin of elytron, subapical band or spot, rarely an apical spot, and longitudinal line extending anteriad from median band usually about halfway into loop but sometimes completely bisecting loop; no longitudinal lines of light maculation ever connecting median band and subapical band; pubescence of elytron with light hairs on areas of light maculation and with a few clusters of light hairs lateral to median band and subapical band. Antennal cavity deeply excavated, 3 times as long as wide, extending full length of lateral margin of pronotum; posterior diagonal margin raised as knifelike carina on same level as anterior margin and meeting lateral carina at base of pronotum; floor of cavity microscopically striate; striations more or less perpendicular to anterolateral wall of cavity. Metasternum not marked with oblique discal striae. Fine discal striae present on abdominal sternite 1, usually extending about one-half length of sternite from

coxal cavities. Tergite of periphallic segment 1 evenly rounded apically with setae extending around apical margin in a single series; middle area of segment not sclerotized. Parameres of phallus narrow, subparallel; bridge relatively transverse and moderately narrow. Length of pronotum and elytra ranging from 1.9 to 2.9 mm. Ratio of width across humeri to length ranging from 1 : 1.62 to 1 : 1.82.

Adult female: Antenna extending in repose to about apical third of lateral margin of pronotum; club four-segmented; segment 7 a little expanded; segments 3 to 6 subequal

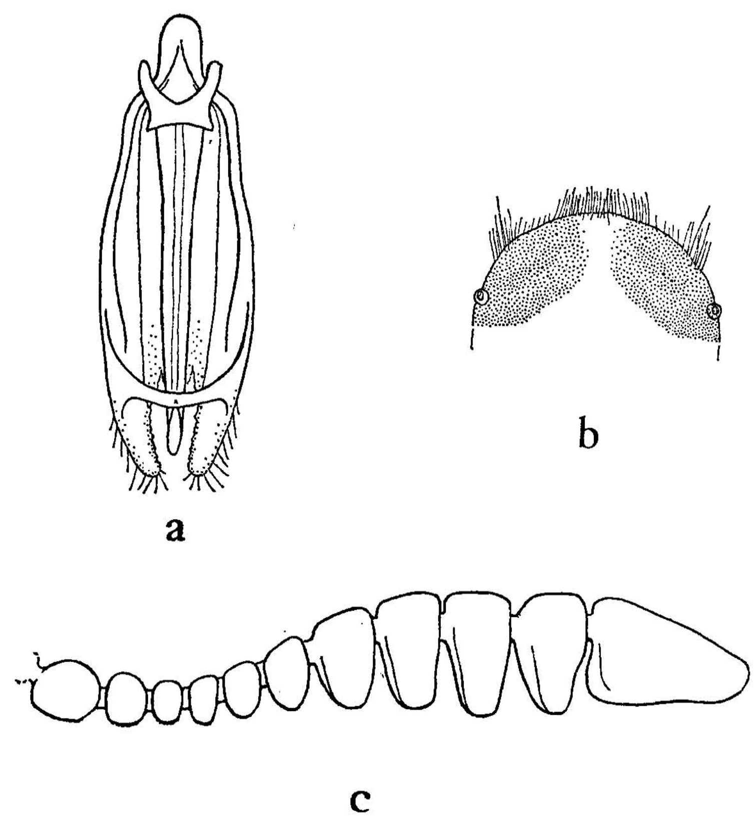


FIGURE 5.—*Trogoderma anthrenoides:* **a**, parameres and aedeagus; **b**, periphallic sternite 1 of male genital tube; **c**, antenna of adult male.

in width. Antennal cavity with deep anterior excavation but very shallow on posterior two-thirds; posterior diagonal margin carinate; carina low but extending to basal angle of pronotum; a short carina extending about halfway across antennal cavity from anterolateral angle of prosternum, this carina forming an angle of 20 to 30 degrees with posterior carina; floor of fossa anterior to short carina finely striate; floor of fossa posterior to short carina confluently punctate. Length of pronotum and elytra ranging from 2.3 mm. to 3.0 mm. Ratio of width across humeri to length ranging from 1 : 1.62 to 1 : 1.58.

DISTRIBUTION: West Indies, Houston, Texas (unpublished data), south along east coast of Mexico to coastal areas of Colombia. Introduced into Hawaiian Is. and S. Mariana Is. (Saipan).

S. MARIANA IS. SAIPAN: Jan. 30, 1945, Smith.

This species belongs to a group of very closely related species which include *Trogoderma sternale* Jayne, *grassmani* Beal, *ornatum* (Say), and *paralia* Beal. Considering the distribution of these species, there is good reason to believe that this species is indigenous to the Nearctic area and that its presence in the Hawaiian Islands and in the Marianas represents an introduction by commerce. Hinton (1945, Monogr. Beetles Assoc. Stored Products **1**: 399) believed this form conspecific with *ornatum*, but this seems to me to be a definite error. *T. ornatum* differs consistently from *anthrenoides* in its pattern of elytral maculation and pubescence, in the wider segments of the male antennal club, in structures associated with the male genital organ, and in several larval characters. The elytral pattern of *T. anthrenoides* never shows a longitudinal line connecting the median band and the subapical band, even when the basal loop and the median band are so pronounced and wide as almost to coalesce. On the other hand, specimens of *T. ornatum* always show some trace of light longitudinal lines between the submedian and subapical bands. If the pattern of *T. ornatum* is at all pronounced, the light longitudinal lines on the posterior half of the elytra are quite evident. *T. anthrenoides* differs from subspecies of *sternale* in the following respects: Antennal segment 3 of the male is subequal in width to antennal segment 4 instead of being about one-half as wide; the short carina which nearly bisects the antennal cavity of the female in *T. anthrenoides* forms an angle of not more than 30 degrees with the posterior carina instead of an angle of about 60 degrees, as it does in *T. sternale;* other differences are found in the male genitalia, particularly in the width and shape of the bridge connecting the parameres and the extent of sclerotization on periphallic tergite 1. The larval characters which separate *T. anthrenoides* from *ornatum* and *sternale* will be described in a separate paper.

This species has been taken in nature in mud dauber wasp (*Sceliphron*) nests and is probably a general scavenger in bee and wasp nests. It has also been reared from *Cassia javanica* pods, tamarind pods, and seeds of *Sophora secundiflora*. Possibly it was in these seeds feeding on remains of bruchid infestations, but, as is the habit of many species of *Trogoderma*, it may have been feeding both on the seeds and on other insects. It has not been recorded as an important economic pest. It was found infesting dried chili peppers in a commissary in Saipan and has been taken in Texas as a pest on dried maize. Possibly in each case it was also feeding on the remains of other insect pests. It has been found on a number of occasions as a pest in dried insect collections.